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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,847	06/20/2003	Keith C. Hong	008-02	8487

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PAUL AND PAUL
2000 MARKET STREET
SUITE 2900
PHILADELPHIA, PA 19103

EXAMINER	
TSOY, ELENA	
ART UNIT	**PAPER NUMBER**
1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/07/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/07/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/600,847	HONG ET AL.	
	Examiner	Art Unit	
	Elena Tsoy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-8,11-21,23,26 and 27* is/are pending in the application.

4a) Of the above claim(s) *26 and 27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-8,11-21 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 15, 2007 has been entered.

Response to Amendment

Amendment filed on January 30, 2007 has been entered. Claims 9-10 have been cancelled. Claims 3-8, 11-21, 23, 26, 27 are pending in the application. Claims 26-27 remain being withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3-8, 11, 16-21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis (US 3,528,842) in view of Joedicke (US 4,378,408).

Skadulis discloses a process for producing algae-resistant roofing granules, the process comprising applying to raw mineral granules (claimed inert base particles) (See column 3, lines 44-46) two layers of ceramic porous coatings (See column 2, lines 41-44; column 3, lines 51-53), wherein layer is formed by applying a coating composition containing kaolin and sodium silicate, pre-drying the applied layer, and then firing at 800-1000 ^{0}F thereby forming a moisture permeable porous pigmented silicate-clay coating (See Examples I-III, column 2, lines 37-55, 71-72; column 3, lines 1-3, 16-53). Water-insoluble algicidal copper compounds such as Cu_2O (claimed cuprous oxide) in an amount of 2 wt % (See column 4, line 39) may be added to the

coating composition of the **first layer** (claimed first intermediate particles) (See Example III) *or* of the second layer (claimed second intermediate particles) (See Example I). The water-insoluble algicidal copper compounds become soluble under acidic conditions and are released from the porous silicate-clay coating in an amount effective to prevent growth of algae on the surfaces (See column 2, lines 55-70). The appropriate pigments generally metal oxides such as TiO_2 may be added to the coating compositions (i.e. to any layer) (See Examples I-III) to impart the desired color to the coatings (See column 3, lines 29-32).

Skadulis fails to teach that first layer further contains a void-forming material that release gaseous material at temperatures above 90^0C, and have an average particle size no larger than 2 mm, which form pores upon firing, and the second layer does not have a void-forming material (Claim 3).

Joedicke '408 teaches that kaolin clay is used extensively in silicate paint formulations for coloring roofing granules as a filler, extender, moisture release agent and reactant to aid film insolubilization during high temperature firing (See column 1, lines 17-22). Impurities in kaolin clay cause grey coloration, such that white colored roofing granule insolubilized alkali silicate coatings using natural kaolin clay frequently require appreciable amounts of expensive TiO_2 to achieve desired white or **light** color (See column 1, lines 33-42). However, the pigment requirements in silicate-clay coating formulations, particularly expensive TiO_2 in white coatings, can be reduced by increasing the opacity, or hiding power, of the coating itself (See column 2, lines 17-26) by adding inexpensive gas-forming compounds such as hydrogen peroxide, sodium perborate ($NaBO_3$) to the silicate-clay coating (See column 2, lines 40-52). Inclusion of gas forming compounds in silicate coatings for roofing granules results in extraordinary *lightening* of the fired coating, which is due to decomposition of the dissolved gas forming compounds to form light scattering *microvoids* (i.e. gas-forming particles should have claimed particle size of less than 2 mm to produce microvoids) that greatly enhance the whiteness and opacity of the silicate coating (See column 4, lines 18-26), and afford significant pigment reductions, particularly TiO_2 in whites (See column 3, lines 1-3). The granules may be coated in one or more coats with any desired amount of coating material and gas forming compound may be used in ***any*** **one** or more of the **coatings** (See column 5, lines 38-41). In other words, Joedicke '408 teaches that roofing granules may be coated in multiple coats with any desired amount of coating material and gas-

forming compound may be used in ***any* one of multiple coatings** to greatly enhance film opacity and afford significant pigment reductions, particularly TiO_2 in whites.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added inexpensive gas-forming compounds such as hydrogen peroxide, sodium perborate ($NaBO_3$) to an algicidal coating composition for making a *first* coating layer on roof granules in Skadulis with the expectation of providing algicidal roof granules with the desired enhanced film opacity and significant pigment reductions, because Joedicke '408 teaches that roofing granules may be coated in one or more coats with gas forming compound being used in any one of multiple coatings to greatly enhance film opacity and afford significant pigment reductions, particularly TiO_2 in whites.

As to pore size, thickness and concentration limitations, it is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant pore size, thickness and concentration parameters (including those of claimed invention) in Skadulis in view of Joedicke '408 through routine experimentation in the absence of showing of criticality.

3. Claims 3-8, 11, 16-21, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis (US 3,528,842) in view of Greenberg (US 3918407).

Skadulis is applied here for the same reasons as above. Skadulis fails to teach that first layer further contains a void-forming material that release gaseous material at temperatures above 90^0C, and have an average particle size no larger than 2 mm, which form pores upon firing, and the second layer does not have a void-forming material (Claim 3).

Greenberg teaches that release rate of toxicant (See column 1, lines 9-12) can be controlled by controlling texture and porosity of a solid heat-cured carrier by incorporating into the carrier before heat-curing a predetermined amount of heat decomposable gas forming particles (See column 3, lines 55-64; column 7, lines 66-67). The internal porosity, texture and

surface porosity of the carrier must be sufficiently coordinated to allow a sufficient release of the toxicant from the carrier (See column 3, lines 58-61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated particles of heat decomposable gas forming compound to a coating composition of a first layer in Skadulis with the expectation of providing the desired release rate by controlling texture and porosity of the layer with the use of particles of gas forming heat decomposable compound, as taught by Greenberg. Obviously, the pore size would depend on particle size of heat decomposable gas forming compound.

As to particle size of heat decomposable gas forming compound, pore size, thickness and concentration limitations, It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant particle size, pore size, thickness and concentration parameters (including those of claimed invention) in the cited prior art through routine experimentation in the absence of showing of criticality.

4. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke '408/Skadulis in view of Greenberg/, and further in view of McMahon (US 3,507,676) for the reasons of record set forth in paragraph 3 of the Office Action mailed on 3/2/2006.

The cited prior art are applied here for the same reasons as above. The cited prior art fails to teach that a combination of cuprous and zinc oxide (ZnO) is used as an algicidal agent (Claim 12).

McMahon teaches that ZnO is suitable for the use as algicide in coating of roofing granules (See column 1, lines 14-15).

It is well settled that it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a combination of cuprous and zinc oxide as an algicidal agent in the cited prior art since McMahon teaches that ZnO is suitable for the use as algicide in coating of roofing granules.

5. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke '408/Skadulis in view of Greenberg/, and further in view of Hojaji et al (US 4,430,108).

The cited prior art are applied here for the same reasons as above. The cited prior art fails to teach that sugar is used as gas-forming material.

Hojaji et al teach that sugar is suitable for the use as gas-forming material (See column 8, lines 47-57) in glass compositions for roof shingles (See column 4, lines 19-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a sugar as gas-forming material in the cited prior art since Hojaji et al teach that sugar is suitable for the use as gas-forming material in glass compositions for roof shingles.

DECLARATION UNDER RULE 132 (37 C.F.R, § 1,132)

6. Declaration filed on January 15, 2007 has been fully considered but it is not persuasive.

(A) Mr. Keith Hong states that since Applicants' algaecide containing coating and commercial algae-resistant granules are typically gray in color, reflecting the use of carbon black in the coating compositions (shown in Exhibits A and B), one of ordinary skill in the art would not be motivated to add a void-forming material such as hydrogen peroxide or sodium perborate to the inner coating composition material in the process of the present invention, simply because increasing the "opacity" of the coating composition would require additional pigment, rather than less as in the case of white or light-colored materials, and would not improve the appearance of the granules (See paragraphs 4-6).

The Examiner respectfully disagrees with this argument. First of all, addition of appreciable amounts of TiO_2 to the coating composition of Skadulis would **lighten** the *dark grey*

coloration of the coating *after* firing (i.e. the fired coating would be *light* grey). Secondly, Joedicke '408 teaches that inclusion of gas forming compounds in silicate coatings for roofing granules results in **extraordinary** *lightening* of the fired coating, which is due to formation of light scattering *microvoids* that greatly enhance the whiteness and opacity of the silicate coating (See column 4, lines 18-26), and afford significant pigment reductions, particularly TiO_2 added to grey colored coatings (See column 3, lines 1-3). It seems that there is no difference in color between TiO_2 containing coating of Skadulis that would be of **light grey color** even *after* firing, and light grey colored silicate coatings of Joedicke '408. One of ordinary skill in the art would reasonably expect that inclusion of gas forming compounds in TiO_2 containing coating of Skadulis, which would be of light grey color even *after* firing, would work the same way as with light grey-colored silicate coatings of Joedicke '408, i.e. the inclusion of gas forming compounds would **extraordinary** *lighten* the color of TiO_2 containing coating of Skadulis *after* firing due to formation of light scattering microvoids. Therefore, one of ordinary skill in the art would have reasonable expectation of success in achieving the same degree of lightness of TiO_2 containing coating of Skadulis but with less amount of TiO_2 by inclusion of gas forming compounds into TiO_2 containing coating of Skadulis because Joedicke '408 teaches that inclusion of gas forming compounds in silicate coatings for roofing granules results in extraordinary *lightening* of the fired coating.

(B) Mr. Keith Hong states that inclusion of gas forming compounds into silicate coatings of Skadulis would be more effective if it is included into the outer layer.

The Examiner respectfully disagrees with this argument. The outer layer of Skadulis carrying **no** algaecide may be formed as a *very* thin layer so that it would not cover the color of the first layer. In this case the inclusion of gas forming compound into first algaecide containing layer of Skadulis would be more effective than if it were included into the outer layer.

(C) Mr. Keith Hong states that inclusion of gas forming compounds into silicate coatings of Skadulis may not work because of dark colored coatings absorb light rather than reflect light.

The Examiner respectfully disagrees with this argument. Skadulis does not limit his teaching of addition of metal pigments to a particular layer, i.e. a pigment may be added to any layer, including the first layer, to achieve the desired color. Obviously, one of ordinary skill in

the art would add appreciable amount of TiO_2 if *light* color of the final coating (i.e. *after* firing) were desired.

Response to Arguments

7. Applicants' arguments filed January 30, 2007 have been fully considered but they are not persuasive.

(A) Applicants argue that Joedicke does not disclose or suggest that the use of gas-forming compound in an interior coat will result in either greatly enhanced film opacity or significant pigment reductions. A person coating roofing granules would understand Joedicke '408's teaching filtered through that person's ordinary skill in the art and common sense. Thus, one of ordinary skill in the art would understand that creating microvoids in an interior layer might or might not contribute to enhanced film opacity and might or might not permit a reduction in expensive hiding pigments, in particular, titanium dioxide, depending on the composition of layers on the outside of the microvoid-containing interior layer. The inclusion of gas forming compounds into silicate coatings of Skadulis would be more effective if it is included into the outer layer the pigmented outer layer or layers would necessarily mask or hide the inner layer, so that light scattering is diminished or extinguished entirely.

The Examiner respectfully disagrees with this argument. The outer layer of Skadulis carrying **no** algaecide may be formed as a *very* thin layer so that it would not cover the color of the first layer. In this case the inclusion of gas forming compounds into first algaecide containing layer of Skadulis would be more effective than if it were included into the outer layer.

(B) Applicants argue that one of ordinary skill in the art would not be provided any suggestion or incentive by Joedicke '408 to add gas-forming material to an interior coating layer for a roofing granule where the exterior layer itself contained a significant amount of light-scattering pigment, such as titanium dioxide.

The argument is unconvincing because primary reference of Skadulis teaches that the appropriate pigments generally metal oxides such as TiO_2 may be added to any layer (See Examples I-III; column 3, lines 29-32), e.g. *only* to the first layer (See Example I) to impart the desired color to the coatings (See column 3, lines 29-32).

(C) Applicants argue that one of ordinary skill in the art would find Joedicke '408 largely irrelevant to the preparation of dark-colored roofing granules. Whereas light- or white-

colored roofing granule coatings include materials such as titanium dioxide that reflect light, dark colored roofing granule coatings include material that absorb rather than reflect light, hence the dark color.

The argument is unconvincing because Skadulis teaches roofing granule coatings having (*any*) desired color by addition of metal oxide pigments including TiO_2 (e.g. light grey color). Therefore, in contrast to Applicants argument, one of ordinary skill in the art would find Joedicke '408 largely relevant to the preparation of light colored roofing granule coatings of Skadulis.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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March 1, 2007